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ABSTRACT SUBMITTAL FORM

Subject Classification Category: 4.8 ICF–Diagnostics [ ] Theory [x] Experiment

Efficient, High-Spatial Resolution Neutron Detector for Coded Aperture Imaging of ICF Targets* R. A. LERCHE, D. RESS, LLNL and R. K. FISHER, General Atomics. Imaging the burning core of an ICF target using fusion neutrons requires an efficient detector. Current systems use plastic scintillator arrays 10-cm thick. These limit detector spatial resolution to > 2 mm. We propose using a neutron-sensitive liquid-filled bubble chamber for recording coded aperture images. Each detected neutron forms only one bubble and the threshold energy for bubble formation can be selected. The bubble chamber can be made thick for efficiency, is insensitive to γ-ray background, and has a resolution < 100 μm. An efficient, high-resolution detector could revolutionize coded-aperture imaging system design. For example, a magnification of 10 instead of 200 would be required to achieve ~10 μm source resolution. Target-to-aperture distance and aperture diameter could be greatly increased. Larger diameter apertures would increase signal level, and be easier to fabricate, characterize, and align. The cost of a bubble chamber detector should be significantly less than the equivalent plastic scintillator array with its associated readout system.

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[x] Prefer Poster Session
[ ] Prefer Standard Session
[ ] No Preference

Submitted by:

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